

6.4 Comparing Sinusoidal Functions

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Sketch a height vs time graph of the sinusoidal function that models a water wheel with a radius of 2m, whose centre is at water level, and rotates every 20 sec. Assume that the first point is at water level entering the water.

Draw two cycles. **Counter clockwise**

20s

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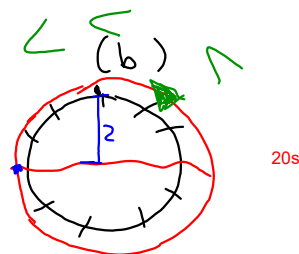
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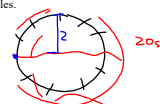
b) nail starts at max height



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Sketch a height vs time graph of the sinusoidal function that models a water wheel with a radius of 2m, whose centre is at water level, and rotates every 20 sec. Assume that the first point is at water level entering the water wheel. Draw two cycles.



amplitude
axis of symmetry

max 2m
min -2m
period 20s

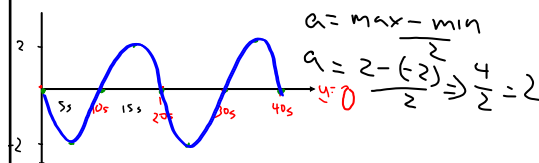
$$\begin{aligned} \text{max} - \text{min} &= 2 - (-2) = 4 \\ \frac{4}{2} &= 2 \\ \text{max} + \text{min} &= 2 + (-2) = 0 \\ \frac{0}{2} &= 0 \end{aligned}$$

0	0
5	-2
10	0
15	+2
20	0
25	-2
30	0
35	+2
40	0

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$$\begin{aligned} \text{equation of axis} &= y = 0 \\ \text{amplitude} &= 2 \\ \text{max} &= +2 \\ \text{min} &= -2 \\ \text{cycle} &= 20\text{s (period)} \end{aligned}$$

$$\begin{aligned} \frac{\text{max} + \text{min}}{2} &= \frac{+2 + (-2)}{2} \\ &= \frac{0}{2} \\ &= 0 \end{aligned}$$



$$y = a \sin x + d$$

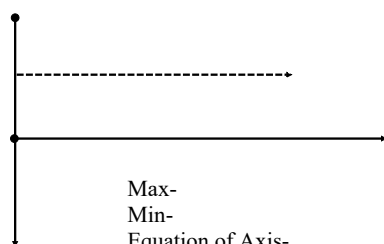
$$y = -2 \sin x + 0$$

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3. Sketch a height-versus-time graph of the sinusoidal function that models each situation. Assume that the first point plotted on each graph is at the lowest possible height.

- a) A Ferris wheel with a radius of 9 m, whose axle is 10 m above the ground, and that rotates once every 60 s **clockwise**



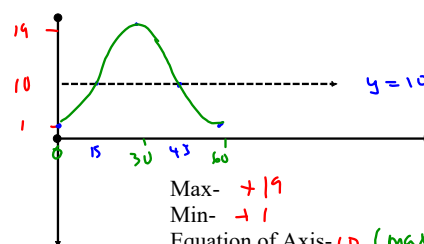
Max-
Min-
Equation of Axis-
Period-
Amplitude-

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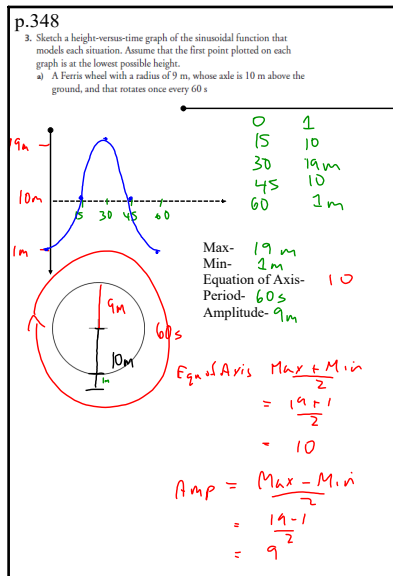
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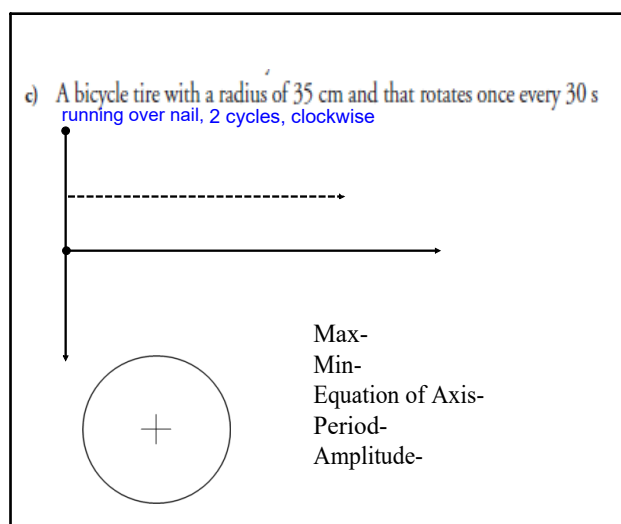


Max- +19
Min- +1
Equation of Axis- 10 (max + min / 2)
Period- 60
Amplitude- 9 (max - axis of symmetry)

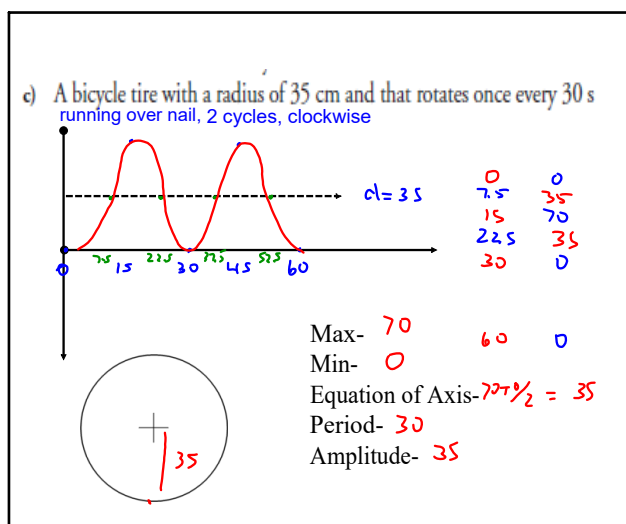
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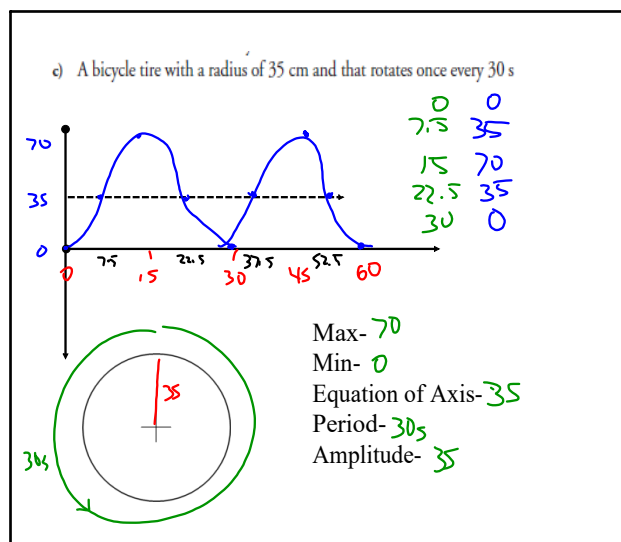
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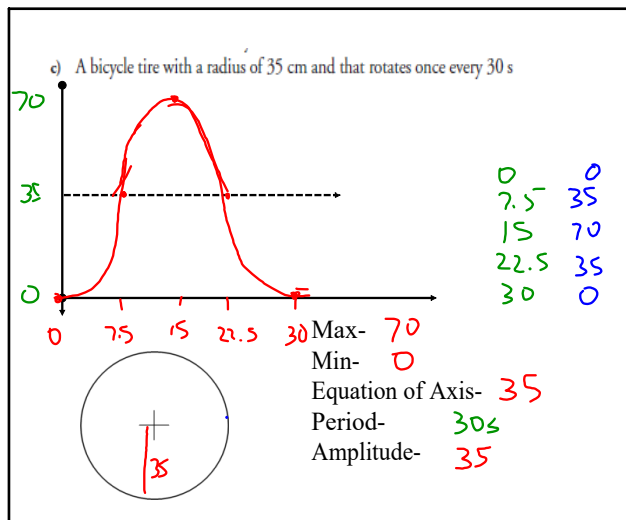
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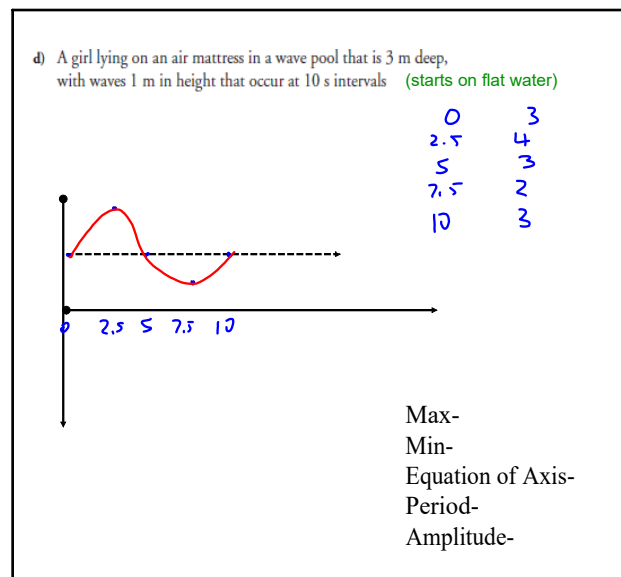
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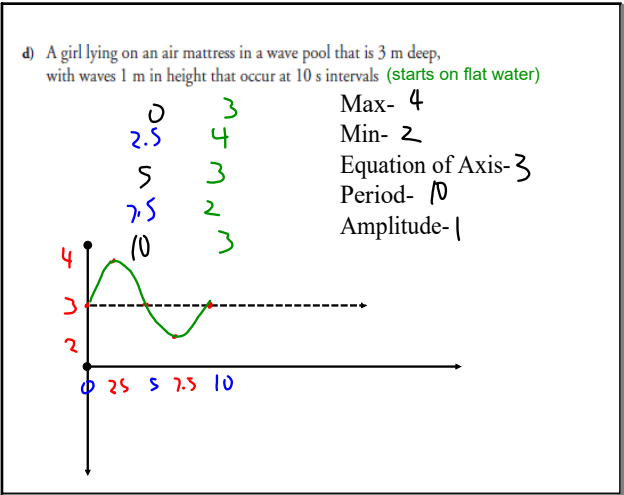
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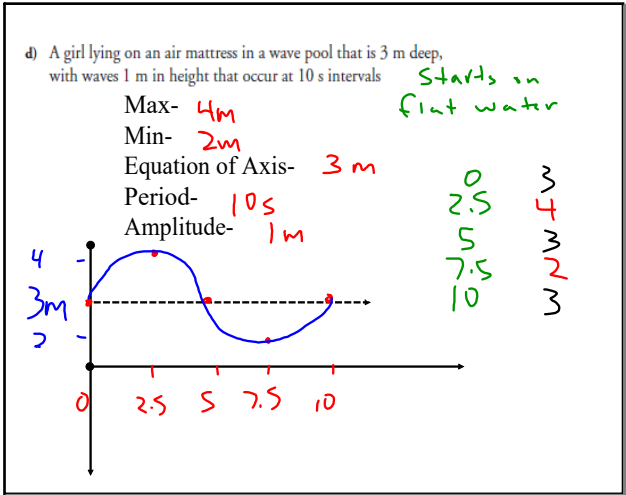
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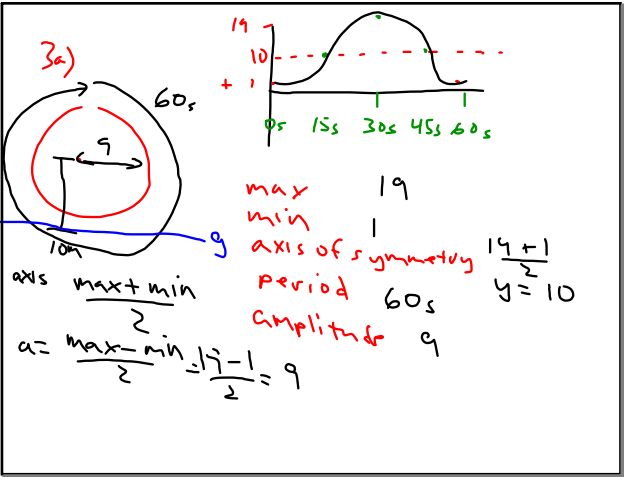
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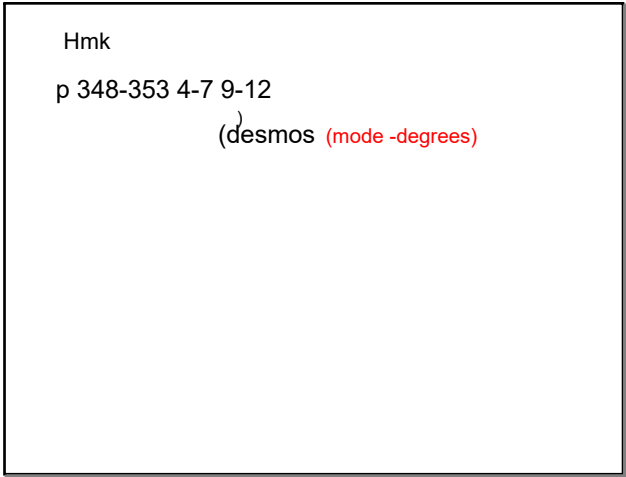
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